VIRGINIA ARMY NATIONAL GUARD

MANEUVER TRAINING CENTER FORT PICKETT

BIRD AIRPLANE STRIKE HAZARD (BASH) CONTROL PLAN

PREPARED BY:

DIVISION OF PLANS, TRAINING & SECURITY

27 September 2012

MEMORANDUM FOR UNLIMITED

SUBJECT: Blackstone Army Airfield (AAF) Bird Aircraft Strike Hazard (BASH) Plan

1. Enclosed is BAAF BASH Plan, 27 September 2012, which provides guidance for the BASH program.

2. This plan fulfills requirements set forth in Federal Aviation Administration guidelines, United States Air Force Instructions and United States Navy regulations. It is effective for planning and execution purposes upon receipt.

3. This plan will be reviewed annually and updated as required.

4. This document is UNCLASSIFIED and does not fall within the scope of directives governing protection of information affecting the national security.

WILLIAM L. KORSEN
COL, AR
COMMANDING

BAAF BASH PLAN SUMMARY

1. **PURPOSE**. To provide an installation program to minimize wildlife strike potential to aircraft.

2. **CONDITIONS FOR IMPLEMENTATION**. This plan considers hazards from both the indigenous bird population and seasonal bird migrations in addition to terrestrial animals. Implementation of specific portions of the plan is continuous, while other portions will be implemented as required by wildlife activity. The wildlife of most concern at BAAF is the bird and deer population.

3. **OPERATIONS TO BE CONDUCTED**.

a. Conduct Bird Hazard Working Group (BHWG) meetings semi-annually and other times as required.

b. Review and refine procedures for reporting hazardous wildlife activity that may present a hazard to flight operations on the airfield, within the confines of MTC Special Use Airspace (SUA).

c. Improve provisions to disseminate information and avoidance procedures to all training and transient aircrews for specific wildlife hazards.

d. Ensure procedures are implemented to eliminate or reduce environmental conditions that attract wildlife to the airfield.

e. Develop procedures to disperse wildlife from the airfield.

4. **TASKED AND SUPPORTING ORGANIZATIONS**. See Appendix 1.

BAAF BASH PLAN
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BLACKSTONE ARMY AIRFIELD BIRD AIRPLANE STRIKE HAZARD PLAN

1. **REFERENCES**

a.FAA Advisory Circular 53/5200-33, Hazardous Wildlife Attractants At or Near Airports, dated 1 May 1997.

b. Air Force Pamphlet 91-212, Bird Aircraft Strike Hazard (Bash) Management Techniques, dated 1 Feb 2004.

2. **SITUATION**. A bird/wildlife aircraft strike hazard exists at BAAF and in its vicinity due primarily to resident and migratory bird species as well as local deer populations. This plan establishes procedures to minimize the hazard at BAAF. No single solution exists to the BASH problem and a variety of techniques and organizations are involved in the control program. This plan is designed to:

a. Establish a Bird Hazard Working Group (BHWG) and designate responsibilities to its members.

b. Establish procedures to identify and communicate hazardous situations to aircrews.

c. Establish aircraft and airfield operating procedures to avoid high-hazard situations.

d. Provide for dissemination of information to all training and transient aircrews on wildlife hazards and avoidance procedures, especially for birds and deer.

e. Establish guidelines to reduce airfield attractiveness to wildlife.

f. Provide guidelines for dispersing wildlife when they gather on the airfield.

g. FRIENDLY FORCES.

(1) Army National Guard Maneuver Training Center Fort Pickett

(a) Division of Plans, Training and Security

(b) Division of Public Works

(c) Virginia Army National Guard Aviation Safety Officer

(2) Army Aviation Support Facility

(3) 437th Airlift Wing, Charleston AFB, SC

(4) 305th Air Mobility Wing, McGuire AFB. NJ

(5) 57th Weapons Squadron, McGuire, AFB, NJ

h. ENEMY FORCES. NA

3. MISSION. To mitigate the risk of incurring damaging aircraft wildlife strikes

4. **EXECUTION.**

a. **Concept of Operations.** Responsibility for overall implementation of this plan is the Division of Plans, Training and Security (DPTS). Reducing the wildlife strike hazard at Blackstone AAF requires a cooperative effort between several installation activities and possibly agencies that are external to the MTC. Each activity tasked in this plan has the responsibility to implement their portion. Responsibility for producing and monitoring compliance of this plan is the installation Air Traffic and Airspace Manager.

b. **Bird Hazard Working Group (BHWG).**

(1) Function. The BHWG will review data on wildlife hazards, identify and initiate actions to reduce hazards, review and implement changes in operational procedures, and prepare informational programs for aircrews and supporting agencies. Serves as point of contact for BASH issues that occur off the installation.

(2) Authority. The BHWG submits all recommendations to the BHWG chairman for approval. Implementation is through the normal chain of command.

(3) Composition. The chairperson will be the Air Traffic and Airspace Manager. As a minimum, the group will consist of the representatives from safety, Public Works Roads and Grounds, Natural Resources, training units and representatives from other organizations as required.

(4) Meeting Schedule. Quarterly or as required by the BHWG Chairperson. Other reduction/avoidance meetings may be held as appropriate, but will report any findings and recommendations at the next BHWG meeting.

c. TASKS. Appendix 2 outlines general and continuing tasks and responsibilities for each organization supporting this plan. Also addressed are specific tasks to counter hazards that are discovered and will remain in effect only until the hazard is removed or reduced sufficiently as determined by the seasonal nature of the hazard or by the BHWG.

APPENDIX 1
TASKED AND SUPPORTING ORGANIZATIONS

1. Army National Guard Maneuver Training Center Fort Pickett

    a. Division of Plans, Training and Security

        (1) Plans and Operations Branch

    b. Division of Public Works

        (1) Roads and Grounds Branch

        (2) Environmental Engineering Branch

        (3) Natural Resources Office

        (4) Buildings and Structures Branch

2. Virginia Army Aviation Safety Officer

3. Army Aviation Support Facility

4. 437th Airlift Wing, Charleston AFB, SC

        a. 437th AW/SEF

        b. 437th OG

5. 305th Air Mobility Wing, McGuire AFB, NJ

6. 57th Weapons Squadron, McGuire AFB, NJ

7. USAF Safety Center BASH Team

APPENDIX 2
TASKS AND RESPONSIBILITIES

1. Air Traffic and Airspace Manager:

a. Chair the BHWG meeting.

b. Reviews and approve/disapprove recommendations of the BHWG.

c. Issues specific guidance to the affected agencies concerning actions required implementing this plan.

d. Seek funding and other resources necessary to accomplish all work required under this plan.

e. Coordinate with Division of Public Works for procedures to reduce available bird roosts within and on hangars and other facilities within their area of responsibility

f. Suggest to pilots, schedulers and appropriate Base Operations that operational changes be initiated to avoid areas and times of known hazardous bird concentrations; pending aircraft availability and mission permitting.

g. Issue specific guidance to installation personnel for the reporting of all potential wildlife strikes or other hazards.

h. Monitor conditions and notify the DPW Roads and Grounds Supervisor when the grass height in the airfield clear zones exceeds 14 inches and needs mowing.

i. Issue bird/deer watch advisories as required by FAA Order 7110.65.

j. Ensure transient aircraft comply with applicable sections of this plan to the maximum extent possible, including posting this document to the Fort Pickett web site.

k. Provide dispersal personnel access to the runway under bird/deer watch condition MODERATE or SEVERE, as required.

l. During Night Vision Goggle (NVG)/Blacked-Out Operations, brief aircrews on previous bird/deer sightings or increased activity.

2. AW/SEF:

a. If possible, provide a representative to the installation BHWG.

b. Monitor the installation compliance with AFI and report all wildlife aircraft strikes and hazards occurring at the MTC to the BHWG.

c. Report on Blackstone AAF BASH program at Wing safety meetings.

d. Monitor all MTC BASH activities or initiatives for compliance with this SOP and USAF directives.

e. Disseminate BASH data to BHWG and Charleston and McGuire AFB flying units. Assure that specific guidance is issued to aircrews on procedures to be followed under bird/deer watch conditions at Blackstone.

f. Provide the BHWG with the current BASH guidance from USAF headquarters.

g. Provide any additional information on migratory, local and seasonal bird activities through contact with the U.S. Fish and Wildlife Service, Audubon Society and other agencies.

h. Monitor wildlife activity and strike statistics and advise the chairman of the working group when a meeting is deemed necessary.

i. Establish a Blackstone AAF wildlife awareness program for flight crews by best practical means and provide information on local wildlife hazards and reporting procedures.

j. Evaluate current conditions and Bird Avoidance Model/Avian Hazard Advisory System (BAM/AHAS) data to recommend appropriate pattern and low-level restrictions for flying operations at or near Blackstone AAF.

k. Establishes and maintains a Blackstone BASH program continuity folder with any pertinent BASH data and information to assure continuity of knowledge.

l. Randomly monitor aircrew preflight briefings to ensure existing Blackstone AAF BASH procedures are briefed.

m. Verify operational changes to avoid areas and times of known hazardous bird concentrations, mission permitting. Coordinate traffic pattern restrictions with the Air Traffic and Airspace Manger.

3. **DPTS GIS/ITAM Office**

(a) Provide a representative to the BHWG.

(b) Provide maps of flight training areas/ranges and low-level routes that include descriptions of known wildlife refuges, bodies of water, landfills and other significant bird attractions in the local flying area.

(c) Post this document on the Fort Pickett web site.

(d) Report any significant wildlife activity noted during periodic observations to the Air Traffic and Airspace Manager, as appropriate. The frequency of required observations make this an excellent opportunity to link wildlife movements with any significant local wildlife survey or bird counting activity.

(e) In cooperation with the Natural Resources Office, develop, maintain, publish and maintain an installation habitat map.

4. **Division of Public Works**

a. Modify airfield habitat consistent with runway lateral and approach zone management criteria IAW with the guidelines of UFC 3-260-01 and consistent with the authority vested in the MTC as a property owner/airfield operator.

b. Correct environmental conditions that increase BASH potential with due regard for manpower, fiscal or environmentally mandated constraints.

c. Actively pursue additional funds to support this plan.

d. Eliminate Roosting Sites. Vegetation management of roost sites will control blackbird and starling roosts where possible. Trees may be pruned to reduce the number of perches available and entire trees or stands removed if necessary.

e. Bird-Proof Buildings and Hangars. Pigeons, sparrows, and starlings frequently roost in buildings and hangars and must be minimized. Denying access by screening windows, closing doors and blocking entry holes is most effective. When necessary, other methods should be considered.

f. Netting. Install under superstructure to exclude pest birds from roosting areas. Ensure no gaps or holes are present for birds to get through.

g. Door Coverings. Use netting or plastic strips suspended over the doors to exclude birds. Ensure no tears or holes are present which allow birds to enter.

h. Sharp Projections. Use in limited areas such as ledges, overhangs, or small places where birds cannot be allowed. Expense prohibits their use over the entire structure but may be the only practical solution to eliminating Turkey Vulture roosting sites on the installation water towers.

i. When planning new structures, consider design features that limit attractiveness to wildlife.

5. **DPW Roads and Grounds Branch:**

a. Coordinate with the post Natural Resources Office on projects to eliminate wildlife habitats on the airfield. Examples include leveling high spots or filling low spots to reduce attractiveness to wildlife and prevent standing water.

b. Remove dead vegetation such as brush piles and excessive grass clippings and the cover it affords as soon as possible.

c. When participating in planning, constructing or repairing facilities consider design features that limit attractiveness to wildlife.

e. Maintain the grass height within prescribed limits.

6. **Natural Resources Office:**

a. Provide Natural Resources representative to the BHWG.

b. Identify environmental conditions that increase BASH potential.

c. Obtain bird migratory activities through US Fish and Wildlife Service.

d. Receive and tentatively identify wildlife remains from runway and taxiway incidents, notify Safety, and hold remains until picked up by the installation safety manager and notify appropriate Command Posts, if their aircraft are involved in a BASH incident.

e. Disperse wildlife from the airfield. Active controls, listed in AF Pamphlet 91-212, Chapter 2, include information on the following

(1) Pyrotechnics.

(2) Bioacoustics.

(3) Depredation.

(4) Other Bird Control Methods.

(5) Ineffective Methods of Control.

(6) Personnel and Equipment.

f. Provide dispersal personnel under bird/deer watch condition MODERATE or SEVERE, as required.

g. Report any significant wildlife activity noted during periodic observations to the Air Traffic and Airspace, as appropriate. The frequency of required observations make this an excellent opportunity to link wildlife movements with any significant local wildlife survey or bird counting activity.

h. Provide pertinent information to the BHWG prior to migratory seasons.

i. Advise the BHWG of environmental modifications.

j. Develop procedures for identification, removal or control of wildlife attractants.

k. When new structures are being planned, assist in the design process, focusing or recommending features that limit attractiveness to wildlife.

l. Assist in writing categorical exclusions and environmental impact assessments and statements, as required.

m. Coordinate wildlife and land management practices, as appropriate, with the USAF and USN Safety Offices (BASH team) to ensure compatibility with safe flying operations.

n. Address BASH issues in the Integrated Natural Resources Management Plan (INRMP) and the Integrated Pest Management Plan.

o. Coordinate permit application procedures with Department of Game and Inland Fisheries and US Fish and Wildlife to ensure operations are handled in accordance with Endangered Species Act, National Environmental Policy Act and Migratory Bird Treaty Act.

p. Ensure appropriate permits are in hand prior to depredation attempts. NOTE: Ensure personnel are trained on the proper use of all wildlife dispersal equipment and dispersal techniques. This training is to be considered as annual recurring training and documented in all personnel's training records. Coordinate with Fort Pickett Police Department, and the Ammunition Supply Point Manager or Quality Assurance Specialist for training/storage requirements and disposition prior to obtaining any pyrotechnics.

q. Incorporate passive airfield hazard control methods listed in AF Pamphlet 91-212, Chapter 2, into existing Natural Resources or training regulations to reduce BASH potential, including:

(1) Grass Height.

(2) Herbicides and Growth Retardant.

(3) Planting Bare Areas.

(4) Fertilizing.

(5) Managing Reforested Areas.

(6) Landscaping.

(7) Removal or reducing edge effects.

(8) Controlling Drainage.

r. Additional Airfield Hazard Control Methods:

(1) Dead Animals. Dead animals will be removed immediately from the field to avoid attracting vultures or other wildlife. Coordinate with the Nottoway County Animal Control Officer through the Fort Pickett Police Department.

(2) Pest Control. Invertebrates and rodents are important food sources for many birds. Public Works personnel should periodically survey and reduce these pests when required. The installation safety officer may assist by coordinating with external agencies, such as the United States Public Health Service, U.S Army Medical Command environmental hygiene specialists etc. Control of insects and rodents, through use of insecticides and any rodenticide will be within Environmental Protection Agency approved methods. Control should begin early in the spring and must be coordinated with the animal control section of the Integrated Natural Resources Management Plan.

(3) Erosion Control Vegetation. Vegetation should be used which is appropriate for this area and supports BASH reduction philosophy (i.e. do not control erosion using plants which produce seeds at heights below 14-18 inches). There is a definite tradeoff between a monoculture reducing the avian presence and the needs to support the environment. All due regard will be given to striking a balance between the two. Risk analysis is an integral part of the management process.

(4) Pellet Guns. Shoot birds for a short-term solution. Experience has shown all birds cannot be removed using this technique. Proper safety equipment is necessary. Ensure proper coordination is conducted prior to the use of pellet guns or any other weapon used for animal depredation.

(5) Trapping/Removal. Use large cage with food, water, and other birds to trap pest birds. Birds can either be released away from the hangar or killed. Permits from the US Fish and Wildlife Service and the state wildlife agencies are required to kill protected birds.

s. Coordinate with Department of Game and Inland Fisheries agents, Safety, Police Department and Range Operations to train in the use of government firearms necessary for dispersal purposes

t. Continue and expand, if possible, game plots (specifically dove plots) that attracts wildlife in the training areas. Evaluate siting criteria to pull wildlife away from the airfield, ideally site them on the installation perimeter as far from the airfield as practical.

u. Evaluate the pros and cons of controlled burning in the vicinity of the airfield as a means to control noxious weeds or scrub growth. Address the rapid and more palatable regrowth and the potential attraction of wildlife. Additionally address the potential for attracting birds that feed on dead or exposed insects. Consider burning only as a last resort or to diminish an increased fuel load.

7. **Wing Safety:**

a. Ensure aircrews participate in the MTC Fort Pickett BASH reduction program by promptly reporting all wildlife strikes and hazardous conditions encountered at Blackstone AAF.

b. Ensure unit personnel report all wildlife sightings on or near the airfield to Charleston and McGuire AFB Base Operations and BASH team. The report will include number, location, and direction of travel and if a runway intrusion occurred.

c. Select low-level routes based on bird hazard data, such as the BAM, and AHAS and local migration data.

d. Obtain and post current wildlife activity data and ensure it is readily available for aircrew briefing and planning activities.

e. Brief aircrews on seasonal wildlife hazards.

f. Will utilize the Air Force Safety Automated System (AFSAS) for reporting all bird strikes occurring at Fort Pickett located at http://einstein.saia.af.mil

8. **AIRCREWS:**

a. If an aircrew observes or encounters any wildlife activity that constitutes a hazard, the aircrew should contact ATC or Range Operations.

b. The following information should be included:

(1) Call Sign & Tail Number

(2) Location

(3) Altitude

(4) Time of sighting

(5) Type of bird/wildlife

(6) Approximate number

(7) Behavior (Direction of movement, stationary)

APPENDIX 3
LOCAL WILDLIFE INFORMATION AND HAZARDS

1. GENERAL LAND USE:

a. The Maneuver Training Center is located in southern Virginia, approximately 45 miles southwest of Richmond. The area is largely forested (75%) and a significant part of the local economy is forestry related. The remaining area is devoted to agriculture, with major production of corn, wheat, soybeans and hay. Some acreage is devoted to pastureland for beef production also.

b. The installation is comprised of over 40,000 acres in portions of four counties. Approximately 7,000 acres are devoted to administrative facilities, troop housing areas and ranges.

c. Approximately 82% of the installation is forested, 25,000 of which are managed for commercial timber production. The remaining acreage is a mix of non-marketable pine and marketable oak forest. There is a an active and on-going effort to reduce the forested areas, in favor of grass and scrub brush lands that more readily accommodate mechanized and armor training.

d. Large areas of the installation are managed for deer, quail and turkey. Public hunting is allowed in most of the maneuver areas.

e. Falling within the Chowan River basin in the eastern piedmont, the post is located at the mid-point between the Atlantic Ocean and the Blue Ridge Mountains. The terrain is classified as a rolling plain with elevations ranging from approximately 190 feet to 450 feet.

2. SURROUNDING AREA:

a. The Bird Hazard Working Group will evaluate the area surrounding the ARNG MTC for habitat detrimental to this BASH plan.

b. This evaluation will be used to identify specific hazards such as wildlife refuges, wetlands, lakes and landfills, to avoid over flying. Through negotiation with the local community, hazards should be modified when possible.

c. Local conditions that bear consideration by the BHWG are:

(1) Nottoway County landfill, 4.2 nautical miles northwest of the airfield.

(2) Dearing Pond, (18STS 386054; N37^{o} 3' 37.02", W77^{o} 56' 23.13"), a 5-acre stocked, wooded recreational area, 1.0 nautical miles east of the airfield. This site is very attractive to wildlife and is maintained in a pristine state by the Natural Resources Office. This site is very attractive to native and migrant birds.

(3) Butterwood Pond (18STS 385062; N37° 4' 2.85", W77° 56' 28.17"), a 5-acre stocked, wooded recreational area, 0.8 nautical miles east of the airfield. This site is very attractive to wildlife and is maintained in a pristine state by the Natural Resources Office.

(4) Private pond 2.7 nautical miles north-northeast of the airfield. This pond is home for approximately 50 resident Canada geese (*Branta Canadensis*). Though year around residents, these geese are capable of flight and may attract migratory waterfowl. These geese are one of the more severe threats in the area because of their flocking nature and size.

(5) Central Vehicle Wash Facility, (18STS 364070; N37° 4' 26.66", W77 ° 57' 54.11") adjacent to the western perimeter of the airfield but 0.8 nautical miles from the primary runway. The settling ponds (approximately 3 acres) have nearly vertical walls that reduce the attractiveness for wading birds. Though it is not stocked with fish, the basins are home to amphibians that may attract diving or skimming birds and serve as a temporary rest area for migratory waterfowl. Effective ground maintenance reduces the habitat for insects and the subsequent attractiveness to birds. Although it is to early to detect a recurring pattern, the winter of 2006-2007 saw a dramatic rise in migratory Canada geese at this facility which continues to the present day.

(6) A bald eagle (*Haliaeetus leucocephalus*) nest site (18STR 393984; N36 ° 59' 50.85", W77 ° 55' 46.10"), 4.7 nautical miles south east of the departure end of runway 22. A nesting pair has occupied this site since 1999.

(7) The Nottoway Reservoir located, at the southwestern corner of the installation (18STR 3596; N37° 58' 28.74", W77° 58' 36.08"), is a attractive area for migratory waterfowl, wading and diving birds and in all probability is the food source for the eagles mentioned in (6) above.

(8) Engineer Floating Bridge site (18STS 390107; N37° 6' 29.19", W77° 56' 13.58") located northeast of the airfield is an attractive site for resting migrant waterfowl and resident birds that frequent larger bodies of water. This site is approximately 16 feet deep, well stocked with fish and covers approximately 2 acres.

(9) The airfield is bounded on the north, south, east and northwest by property deeded to Nottoway County as part of the Base Realignment and Closure (BRAC) process. The property boundary is within 250 feet of the runway 4-22. The Local Redevelopment Authority is aggressively recruiting industries of all types to occupy this land and an additional 1,400 acres, south of the airfield. The MTC has no control over this area, including mowing, housekeeping and desirable habitat avoidance. As of the publication date there have been no additional industrial activities with any significant impact on airfield operations.

(a) A multi-million dollar saw mill has been constructed within several hundred feet of runway 4-22. This facility may well provide habitat for rodents and additional roosting sites in open-ended buildings, unprocessed logs, stacks of dimensional lumber, and elevated open metal frame structures (dust collectors, cranes, material handling systems). Careful attention must be drawn to the probability of there being an increasing starling and pigeon

population in the vicinity of the airfield. As of this update, the sawmill has proven to be a good neighbor with good housekeeping techniques; however, there has been a progressive accumulation of unusable logs and debris over the past year. The dump site continues to be enlarged, providing ideal habitat for wildlife that ultimately provides food for raptors and carnivorous mammals.

(10) Open top dumpsters are a target for crows and other scavengers. These dumpsters are not under MTC control; rather they belong to the Town of Blackstone and are dumped every 7-10 days. It is reasonable to expect that as long as the public can surreptitiously dump their household waste in this dumpster, this will continue to provide rodent habitat and a food station for birds. The MTC dumpsters have a top and waste is deposited through side doors. They are dumped on a recurring basis and on-demand. Units depositing trash in them do not always close the side doors. This is true across the installation as well.

(11) The MTC hanger is metal bow truss and block construction with no netting to prevent birds from roosting/nesting in the eaves or trusses. Several windows are missing and the doors still allow some entry points even when closed. The hangers owned by the Town of Blackstone are metal clad wooden A-frame rafter and joist construction.

(12) Immediately north of the airfield is a 1,000-acre (+/-) agricultural research facility owned by Virginia Polytechnic Institute and State University. The majority of research conducted revolves around forage crops, tobacco and tomatoes, but there are a number of attracts for wildlife. Included, as potential attractants, are fruit trees, fruit bearing bushes such as blackberries, and a variety of ground cover and water. No specific hazard has been associated with this facility.

(13) Attempts to scare the birds away may be futile. The airfield has no assigned manning. Persistence in a BASH program may not be as viable at Blackstone when compared to other facilities.

3. HABITAT MAP:

a. A habitat survey will be conducted to identify major habitat types available to wildlife. A map will be made based on this survey.

b. When a specific hazard is identified and the location of the activity isolated, the habitat map should be consulted to determine if a specific attractant exists which might be altered within the scope of this plan and legal limitation (jurisdiction) of the MTC.

c. The habitat map will also be used as a guide for a long-range engineer program to reduce actual and potential hazardous environmental factors on BAAF.

4. BIRDS:

a. Since 1986, bird strikes have caused nearly $500 million in damage to USAF aircraft as well as 33 fatalities. On average, USAF aircraft incur 2,500 bird strikes per year, most of which

occur during fall and spring migration. About 69% of all USAF bird strikes are below 1,000 feet above ground level and 26% of known USAF strikes occur along low-level training routes and ranges. These low-level strikes represent 65% of the damage caused by bird strikes to USAF aircraft. A synopsis of bird strikes and dollar damage to Air Force aircraft by common species in the MTC area is located at Appendix 6.

b. Raptors and blackbirds/starlings represent a year-round hazard at Blackstone AAF. Raptors, specifically black and turkey vultures (*Cathartes aura* and *Coragyps atratus* respectively) are the most significant hazard, based on body weight, soaring habits and population density during late fall and winter months.

(1) A recent unscientific survey revealed 62 airborne vultures within two nautical miles of the airfield. The birds congregate in the local area and have established roosts on the three installation water towers. The towers Universal Transverse Mercator (UTM) grid and latitude and longitude locations are 18STS 384032 (N37^{o} 2' 25.52", W77^{o} 56' 28.46"), 18STS356064 (N37^{o} 4' 6.40", W77^{o} 58' 025.71"), 18STS 375048 (N37^{o} 3' 16.47", W77^{o} 57' 6.86"). The period from late October to early March is the peak density period for this behavior.

(2) Normally the majority of the birds will stay on the roost site and warm themselves until the sun is well above the horizon. About 1-1 ½ hours past sunrise they will take to the air and soar at various altitudes in 1 to 3 loose clusters. The author assumes they are beginning to pick up the first thermals as opposed to responding to flocking habit. They will disperse about 2 ½ - 3 hours after sunrise.

(3) Two to 2 ½ hours prior to sunset the vultures will again begin to assemble in the general area of the water towers and reverse the process described above. Observers have noted the majority of the birds have settled on the roost ½ to 1 hour prior to sunset.

c. There are quail (*Colinus virginianus*), wild turkeys (*Meleagris gallopavo*), blackbirds (all species), grackles (*Quiscalus* sp.), starlings (*Sturnus vulgaris*), ducks, and Canada geese on or near the installation. Large portions of the installation are suitable quail and turkey habitat. Favoring different environments, they have not posed a BASH problem at Blackstone. The turkeys will generally remain near the woodline and the quail will remain in more open areas. With the industrialization around the airfield, quail, which have suffered a dramatic population decrease in recent years, may be eliminated as a substantial BASH concern. The inverse is true for the wild turkey population, which has soared in the past years. As many as 30 birds have been sighted in close proximity to the primary runway. In fact there has been one significant turkey and plane interaction that resulted in mission cancellations for two weeks and over $3500 in repairs to the aircraft.

d. The threat from small birds that flock densely must also be considered a serious threat. European starlings house sparrows (*Passer domesticus*), and rock doves/domestic pigeons (*Columbia livia*), all of which live on the airdrome are not federally protected in the United States and require no federal depredation permit. The BASH potential is most significant starting in late-October and continuing as late as early-March, throughout daylight hours. For the past five years, 2-3 Northern Harriers (*Circus cyaneus*) have taken up winter residency at the

airfield. The presence of the starlings was dramatically reduced after the appearance of these raptors, even though starlings are not a primary food source for the Harriers.

e. During the migration season, transient aircrews will receive a briefing that indicates a heightened state of awareness for aircrews. Birds will generally not fly in poor weather, and will often look for the same favorable conditions desired by pilots.

5. OTHER WILDLIFE: Other species, which are known to inhabit the installation and present a potential hazard to flight operations, include deer, dogs, and various smaller forms of wildlife (raccoons, rabbits, etc). The environment surrounding the airfield is ideal deer habitat. On the MTC there are approximately 30,000 acres of deer habitat. There have historically been two herds of deer that are airfield residents. The deer population has exploded as Force Protection measures reduced the number of hunters on the installation. As many as 60 deer have been counted on the airfield at one time. Predation has been the only option after one deer strike by a USMC KC-130 and several near misses. With the cooperation of the Virginia Department of Game and Inland Fisheries, approximately 80% of the deer population has been removed. The combination of available food sources and natural cover result in a habitat condition rated "good to excellent". Industrialization has not reduced the deer population in the vicinity of the airfield.

6. BIRD AVOIDANCE MODEL (BAM):

a. BAM and interpreting the output. The USAF BAM is a GIS-based system that allows for a great visual representation of the bird hazard through the map images created. It is separated into 26 2-week intervals for year-round coverage and is further subdivided into 4 daily periods (dawn, day, dusk, and night).

b. Species Represented. Sixty species were included in this version of the BAM. Referencing the historical database and discerning the species with the highest overall risk to low-level flight chose the species. Also, size and behavior (especially flocking and migratory aspects) were key characteristics used to decide the 60 species included in the BAM.

c. Data Use. The BAM relies primarily on the Christmas Bird Counts (CBC) and Breeding Bird Surveys (BBS); these two datasets provide great information for the 60 species represented; the winter and summer distributions are shown using the CBC and BBS; however, fall and spring distributions are not taken into account through these two sources, therefore, interpolation (between the CBC and BBS data) was required in order to represent the two transition seasons.

d. Hazard Assessment. The bird species were compiled into 16 different groups and behavioral patterns were aggregated (assessed activity during the four daily periods). Summing the bird mass for each 1 square kilometer grid created the hazard surface.

e. Limitations of the new BAM.

(1) Historical in that it can't adjust for real-time fluctuations

(2) Developed for low-level and not the airfield environment

(3) Heavily reliant on CBC and BBS data

(4) Routes (March 1997 NIMA data) are fixed in the first version

(5) Application Model is not bird-specific; No capability to assess single species contributions;

(6) Hazard assessment is not the total bird mass per square kilometer since 60 species are included in the model

(7) Birds on the ground or in the air - BAM was not designed to identify between the two due to data limitations.

(8) Nocturnal species absent from BAM; were not considered a threat to low-level flight.

f. BAM in the future. The BAM and its implementation/use will certainly be changing in the near future. Please consult the web sites below for updates. The first version of the new GIS-based BAM provides the most complete and comprehensive historical bird hazard assessment so please use it to mission plan. The current version also provides a strong platform in which to build off of as new distribution and bird abundance data becomes available. Subsequent versions will be greater defined with stronger trend information. Additionally, NEXRAD Weather Radar data will be added to the BAM to aid in the fall and spring migration assessments. More importantly, NEXRAD will be used to provide 24-hour forecasts to aircrews.

g. The Air Force BASH team may be contacted at DSN 246-5674/5679/5673. The website for USAF BASH is: safety.kirtland@af.mil/AFSC/Bash/home.html and BAM website images may be viewed at http://www.usahas.com/bam/.

h. Http://www.safetycenter.navy.mil/aviation/Operations/BASH/bash.htm is the website for the Navy BASH program. Additional information may be obtained by contacting Aviation Facilities Branch Head: Fuels, BASH, CFFR, Code 114, DSN 564-7281 or e-mail: rthompson@safetycenter.navy.mil

i. BAM models may be found at http://bam.geoinsight.com/Model.

APPENDIX 4
BIRD & DEER WATCH CONDITIONS

1. GENERAL. This operation establishes procedures to be used for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of wildlife posing a hazard to safe flying operations. Rapid reporting of bird or deer activity is particularly essential. All personnel working on or near the airfield must be perceptive to wildlife activity and must immediately notify the Airspace and Air Traffic Manager if there is potential for a hazardous situation.

a. Declare bird/deer watch conditions based on the following:

(1) Information relayed by aircraft.

(2) Observations made by tower, firefighters, police officers and transient personnel.

(3) Weather, time of day, and seasonal conditions, such as hunting, which make an influx of deer onto the airfield likely.

2. BIRD WATCH CONDITIONS (BWC). The following terminology will be used for rapid communications to disseminate bird activity information and implement unit operational procedures. Bird locations and direction of flight should be given with the BWC.

a. BWC **LOW**. Bird activity on and around the airfield representing low potential for strikes.

b. BWC **MODERATE**. Concentrations of birds (for example, flocks of 5 to 15 large waterfowl, raptors, gulls, etc or 15 to 30 small birds terns, swallows, etc) observable in locations, such as in the traffic pattern loitering at or below 2,000 feet MSL, that represent an increased potential for strikes and probable hazard to safe flying operations.

c. BWC **SEVERE.** Heavy concentrations of birds (for example, flocks of more than 15 large birds or 30 small birds) on or immediately above the active runway, taxiways, in-field areas and departure or arrival routes, loitering at 2,000 feet MSL or below, that represent a high potential for strikes.

d. **Consider the following during periods of increased bird activity**:

(1) When increased bird activity is observed, airfield personnel will evaluate the amount and location of bird activity and consider the *potential* for bird strikes before making a recommendation to the appropriate Wing Command Posts to revisit the number of aircraft and times that training sorties are sent to Blackstone AAF. ***Numbers alone should not determine BWC*.**

(2) Change pattern direction (i.e. left vs. right) or pattern altitudes to avoid bird concentrations.

(3) Restrict pattern operations to full-stop landings or restricted low approaches.

(4) Avoid takeoffs and landings an hour prior to and after sunrise/sunset.

3. BWC Restrictions.

a. BWC **Low** - No operating restrictions.

b. BWC **Moderate** - Initial takeoffs and final landings allowed only when departure and arrival routes will avoid bird activity. Local IFR/VFR traffic pattern activity may be modified or prohibited.

c. BWC **Severe** - Recommendation that all takeoffs and landings be prohibited. Final authority rests with the aircraft or mission commander contingent on mission requirements.

4. DEER WATCH CONDITIONS (DWC). The following terminology and procedures will be used for rapid communications to disseminate deer activity information and implement unit operational procedures. Deer locations and direction of movement should be given with the DWC.

(1) **DWC LOW.** No deer sighted within the airfield perimeter. **Minimal threat to flying operations**.

(2) **DWC MODERATE**. 1-5 deer sighted within the boundaries, but no closer than 200 feet to a landing surface. **Increased threat to flying operations**. This condition requires increased vigilance and extreme caution by aircrews.

(3) **DWC SEVERE**. More than 5 deer sighted within the airfield perimeter and/or any deer within 200 feet of a landing surface. **Likely threat to flying operations**.

(4) In the event 3 deer are sighted within the fence perimeter for three or more consecutive nights (DWC MODERATE or SEVERE) with no applicable cause identified, the Natural Resources Office will determine if the Depredation Plan will be activated.

5. DWC Restrictions. Ensure compliance with the following:

a. **DWC Low –** No operating restrictions.

b. DWC **Moderate –** Increased vigilance by all agencies. Consider full-stop landings only. Use extreme caution if performing touch and go landings or assaults.

c. DWC **Severe –** No touch and go landings or assault landings authorized. If possible, full-stop landings should be delayed until the DWC has decreased to Moderate or Low. Full stop

landings on the main runway using extreme caution will be allowed in the case of greater emergency.

6. AUTHORITY. During flight operations the authority to change bird/deer watch conditions at Blackstone Army Airfield is vested with the Air Traffic and Airspace Manager. Once a bird/deer watch condition has been changed to MODERATE or SEVERE, it is the responsibility of the installation personnel to ensure immediate dispersal actions are implemented to downgrade the condition. SEVERE should last no more than 15-20 minutes. Once the hazard has been minimized, dispersal personnel will contact the Airfield Manager who will downgrade the bird or deer condition.

7. COMMUNICATIONS. Bird/deer watch conditions will be disseminated by the following means:

(1) Bird/deer watch conditions other than LOW at BAAF will be included in all pilot briefings or upon initial contact with installation personnel by radio.

(2) At training areas outside the airfield, all Drop Zone Safety Officers, (DZSO), Combat Control Team (CCT) personnel, Tactical Air Control Party (TACP) personnel, Range Safety Officers, Range Officers-in-Charge (OIC) and ground or air Forward Air Controllers may upgrade the bird/deer watch condition as necessary for a specific local hazard. If condition is upgraded, responsible individual making the upgrade must immediately notify any inbound aircrews.

(3) If the bird density increases significantly during spring or winter months, the Air Traffic and Airspace Manger will notify the appropriate Wing Current Operations for possible scheduling changes to avoid peak periods (such as avoidance of transition work +/- 1 hours around sunrise/sunset). These periods would correspond to the USAF definition of Phase II activity. This notification may be by e-mail or telephone.

8. NVG/BLACKED-OUT OPERATIONS. Aircrews will be briefed on any previous wildlife sightings or increased activity that would affect their operations during NVG/Blacked-Out Operations. If a bird/deer activity report is received from an airborne aircraft, drop/landing or range officer or any other individual or agency, the Air Traffic and Airspace Manager will be immediately notified. Aviation units training on the installation that have an organic Operations section will be notified also.

9. DEPREDATION.

a. If bird or deer activity presents an immediate hazard to aircraft operations and normal dispersal methods are ineffective, a bird/deer depredation operation may be necessary. Assistance from the United States Fish and Wildlife Service, the Virginia Department of Game and Inland Fisheries or other agencies is desirable for a depredation program.

b. The Air Traffic and Airspace Manager and installation Natural Resources Office are the points of contact for wildlife depredation. They will consult with the United States Fish and

Wildlife Service prior to initiating bird depredation to prevent unintentional killing of environmentally protected birds. The approval authority for any depredation attempt is the Natural Resources Office.

c. The airfield normally will be NOTAMed closed while a planned depredation takes place unless there is constant communication/contact with the depredation team.

APPENDIX 5
REPORTS AND FORMS

1. GENERAL: Procedures and forms report wildlife strikes would be IAW service regulations. For damaging strikes, the installation staff will assist in notifying the flying unit's command post.

2. NON-DAMAGING STRIKE REPORT:

a. A non-damaging strike is any wildlife strike that does not damage the aircraft or cause damage to the aircraft will be IAW service regulations.

3. <u>DAMAGING STRIKE REPORT</u>: Wildlife strikes, which cause reportable aircraft damage, are reported to appropriate agencies IAW with service regulations.

4. <u>BIRD/WILDLIFE REMAINS IDENTIFICATION</u>:

a. Wildlife remains taken from aircraft or airfields following all strikes on U.S. Air Force aircraft will be forwarded to Smithsonian Institution. All remains such as downy feathers can be used for positive identification, and are not to be discarded.

b. The State Aviation Safety Officer will forward the remains to:

Smithsonian Institution, Natural History Bldg.
Division of Birds, Attn: Dr. Carla Dove
NHBE 610 MRC 116
10th and Constitution Ave NW
Washington DC 20560

APPENDIX 6

USAF WILDLIFE STRIKES BY COUNT

The species listed below have a significant presence on the MTC. The table is only to illustrate the degree of damage by lost dollar value that birds cause for aviation. The figures shown reduce the maintenance dollars, aircraft availability and impact on operational tempo.

COMMON NAME	STRIKE COUNT	COST
American Mourning Dove	526	$935,271.74
Hawks, Eagles, Turkey Vulture	459	$36,344,115.50
Eastern Meadowlark	348	$417,687.74
Red-tailed Hawk	328	$12,560,477.70
Killdeer	245	$152,738.00
Starling/Blackbird	325	$12,767,647.55
Rock Dove/Pigeon	229	$1,573,899.97
American Crow	67	$401,353.44

APPENDIX 7
SELF-INSPECTION CHECKLIST

1. Is the BASH plan current and readily accessible?

2. If the installation has an aviation mission, has a BASH reduction program and written plan been established?

3. Is the BASH plan reviewed annually?

4. Are changes and annual reviews posted to the plan?

5. Does the program establish a Bird Hazard Working Group (BHWG)?

6. Are installation agencies such as Safety, Public Works, Natural Resources and Range Operations assigned responsibilities for the BASH program?

7. Are written orders on file listing the personnel establishing the BHWG, the chairperson and the authority/need for a BASH working group?

8. Does the BHWG meet at least semiannually as a separate meeting or along with another meeting containing the same members?

9. Are BASH topics included in flight safety briefings?

10. Are posters, pictures, maps, etc., related to BASH posted in the aircrew briefing areas, safety bulletin boards and flight planning areas or available to transient aircrews or training units?

11. Are local bird problems documented?

12. Are both damaging and non-damaging bird strikes recorded?

13. Are all non-damaging bird strikes reported?

14. Are bird remains (feathers, beaks, and feet) collected as a result of a bird strike?

15. Are bird remains sent to the Smithsonian Institution for identification?

16. Is the bird strike information tracked to facilitate the identification of trends (for example, type of bird, route, time of day, type of aircraft)?

17. As part of the bird awareness program, do you have a bird identification book?

18. Are daily surveys taken of the airfield and surrounding area to observe potential and actual bird hazards?

19. Are records of daily observations kept in order to establish trends?

20. During the surveys, are areas like standing water, food sources, or areas for protection noted?

21. Is the vegetation on the airfield particularly attractive to birds?

22. Does the mowing guideline specify that the grass be maintained at a height of 7-14 inches?

23. Is controlled burning practiced on the airfield and in the training areas?

24. Are trees or shrubs located within Primary Surface and Clear Zone of the runways removed?

25. If no to Item 24, are these trees or shrubs attractive to birds?

26. Are birds attracted to the taxiways or active runways?

27. Has it been determined what type birds are attracted to the taxiways and runways?

28. Are there areas with water (ponds, lakes, swamps, etc.) attractive to birds?

29. Are the birds, feeding in these wet areas?

30. Has it been determined what types of birds are attracted to these wet areas?

31. Do wet areas contain vegetation along their perimeters?

32. Do the wet areas contain fish or amphibians (frogs or salamanders)?

33. Are there other areas near the runways that attract birds?

34. Has it been determined what is attracting the birds?

35. Has it been determined what type of bird is being attracted to these other areas?

37. Does farming in the surrounding area attract birds?

38. Does the base outlease cropland on adjacent areas?

39. Are there garbage dumps, landfills, or sewage lagoons in the area near the installation?

40. Do the landfills or sewage lagoons attract birds?

41. Are there other areas attractive to birds near the base (for example, lakes, ponds, swamps and wildlife areas)?

42. Have aircraft hangars and buildings been inspected for pest birds?

43. Are hangar doors left open all the time?

44. Is the cost of cleaning up the bird droppings and any damage incurred less than any type of solution to the problem?

45. Is there an active hunting presence on post?

46. Are game birds and deer controlled so they do not interfere with flying operations?

47. Does the control tower warn operations and pilots of birds in the airdrome?

48. Are there designated bird control teams that actually manage and controls birds and maintain bird dispersal equipment and permits?

49. Is the control team actively patrolling the airdrome?

50. Does the BHWG suggest ways of altering the situation or changing the habitat to discourage birds from the areas before using elimination or reduction techniques?